



ERACoSysMed Workshop “Generating Impact in Clinical Practice”

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ERACoSysMed

The ERA-NET ERACoSysMed has been a consortium of funding agencies aiming at promoting the implementation of systems biology approaches in clinical research and medical practice in order to strengthen systems medicine in the European Research Area.

Systems medicine

Systems medicine is a novel approach in medicine. It is an integrated and interdisciplinary research strategy to study various biological systems (e.g. genetics, physiology, biochemistry) and their behavior across different organizational levels – at molecular and cellular level, within organs and organisms as well as the environmental interactions – with the aid of data-driven computational models and model-based experimentation. Systems medicine aims to improve disease diagnosis and prognosis, targeted therapy as well as prevention. Ultimately, systems medicine aims towards more personalized medicine, which may radically change the interaction between patients and healthcare professionals.

The field of systems medicine encounters several difficulties and challenges such as: (a) development of appropriate mathematical models, (b) managing and sharing enormous amounts of data, (c) acquisition of enough data, (d) development of efficient, flexible and accurate computational tools, (e) effective transnational collaborations, (f) mindset to work truly interdisciplinary, (g) identification of clinically relevant biomarkers, (h) implementation of a systems medicine approach in daily clinical practice and (i) generation of impact for patients, society and economy.

Workshop

ERACoSysMed organized a workshop for the projects funded in its first and second transnational call to identify potential impact of these projects on clinical practice and for the benefit of the patients. Furthermore, the aim of the workshop was to discuss bottlenecks, challenges and needs to achieve significant impact. The following definitions were used: (I) *output*: the most immediate results of a research project, (II) *outcomes*: external use, adoption or influence of a project's output by various users and (III) *impact*: changes in economic, environmental and social conditions that a project is working toward. During the discussions the following points were raised:

- Generating impact is a complex process consisting of multiple steps between scientific results (output) and outcome as well as between outcome and impact, in which multiple stakeholders (e.g. scientists, clinicians, patients, and patient organizations) are involved. Therefore it is advised to clarify who is responsible for each defined step at the start of a project.
- Generating impact starts with generating scientific output and its dissemination by scientific publications, presentations and published databases. In the next step a facilitator is needed to bridge the gap from outcome to impact. It is advised to involve professionals with expertise in valorization and technology transfer in the course of potential new (or follow-up) projects.
- High-quality standardized and curated datasets are a prerequisite for systems medicine research. Data sharing is crucial for the advancement of the field of systems medicine both within and between projects. This is even more urgent in the case of rare diseases, for which data sources are scarce. Therefore it is crucial to have an appropriate infrastructure in order to achieve sustainable databases, which allow sharing and reuse of data. Interaction with European research infrastructures with open access and open data policies will facilitate project visibility and reuse of data.

- Systems medicine can benefit from a more intense involvement of and collaboration with patients and patient organizations. They can give input on the aims, outcomes and potential impact of projects. It is important to clearly define the role of patients and patient organizations in a project. The role of patients and patient organizations is often complicated by the fact that this involvement varies across countries within the EU, which is related to differences in laws and regulations. It is advised to get harmonized the role of patients and patient organizations in Europe.
- Health researchers, clinicians and pathologists should be made aware what systems medicine is and how it can be applied to improve clinical practice. Although dissemination and implementation are responsibilities of the researchers involved, funding agencies are further asked to organize workshops and training about implementation and involvement of various stakeholders as well as in helping disseminate project results.
- Research using systems medicine approaches is time consuming because of iterative cycles of data-driven modelling and model-based experimentation. Therefore, it is advised to provide follow-up funding of promising systems medicine projects to increase the probability to validate and implement their results in clinical practice.